

**REMARKS/ARGUMENTS**

The present Amendment is in response to the Office Action having a mailing date of September 7, 2006. Claims 1-35 are pending in the present Application. Applicant has amended claims 1-2, 5-10, 12-15, 17-21, 23, 25-26, 28-33 and 35. Applicant has also added claims 36-40. Consequently, claims 1-40 remain pending in the present Application.

Applicant has amended claims 12-13 to correct minor errors. Applicant has also amended claim 17 to depend upon independent claim 14, instead of claim 15. Applicant has also amended claims 1-2, 5-6, 8-10, 14-15, 18-19, 20-21, 23-26, 28-33 and 35 to correct minor errors. For example, the phrase “soft magnetic” has been inserted before the term “pole” to ensure that all terms have proper antecedent basis. In addition, claim 15 has been amended to correct another error such that claim 15 depends on claim 14 instead of claim 1. Applicant has also amended claim 14 to recite that the second soft pedestal has a thickness of less than four hundred fifty nanometers between the nanoscale nonferromagnetic gap and the second soft magnetic pole layer. Support for the amendment may be found in Paragraph 22 of the present application. Applicant has also added claims 36-39. Claims 36-40 correspond to previously presented claims 19-22 and 24, in independent form. Accordingly, Applicant respectfully submits that no new matter is added.

In the above-identified Office Action, the Examiner indicated that claims 3, 8, 9, 16, 19-22, 24, 27, and 29-34 would be allowable if rewritten or amended to be in independent form, incorporating the limitations of the base claim and any intervening claims.

Applicant welcomes the Examiner’s indication that claims 3, 8, 9, 16, 19-22, 24, 27, and 29-34 contain allowable subject matter. In addition, for the reasons describe below, independent claims 1, 14, and 25, as well as the claims dependent thereon, are also allowable. Accordingly,

Applicant respectfully submits that claims 3, 8, 9, 16, 19-22, 24, 27, and 29-34 are allowable as currently presented.

Applicant has also added claims 36-40. Claims 36-40 correspond to previously presented claims 19-22 and 24, in independent form. The Examiner had previously indicated that claims 19-22 and 24 contain allowable subject matter. Accordingly, Applicant respectfully submits that claims 36-40 are allowable as currently presented.

In the above-identified Office Action, the Examiner rejected claims 12-13 and 17 under 35 U.S.C. § 112, second paragraph. In particular, terms in claims 12 and 13 were found to have insufficient antecedent basis. In claim 17, the Examiner was “unclear in what sense the conductive section can substantially encircle both the backgap and the second pole.”

Applicant has amended claims 12 and 13 to recite the “soft magnetic pedestal” in lieu of the “second pedestal”. Consequently, the terms in claims 12 and 13 have proper antecedent basis. Applicant has amended claim 17 to depend upon independent claim 14. Consequently, the conductive section is recited as encircling the backgap. Accordingly, Applicant respectfully submits that claims 12, 13, and 17 are clear and definite.

In the above-identified Office Action, the Examiner rejected claims 1, 4-7, and 10-11 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,583,954 (Sasaki I). In so doing, the Examiner indicated that Sasaki I “remains silent as to the specific relationships set forth in claim 1. However, the Examiner conclude that Sasaki I renders claim 1 unpatentable because “[i]t would have been obvious to a person having ordinary skill in the art to have had the magnetic head of Sasaki [I] satisfy the relationships set forth in claim 1.” In particular, the Examiner concluded that it is well known:

**in the magnetic head art to routinely modify a magnetic head structure in the course of routine optimization/experimentation and thereby obtain various optimized**

**relationships including those set forth in claim 1. Moreover, absent a showing of criticality (i.e., unobvious or unexpected results), the relationships set forth in claim 1 are considered to be within the level of ordinary skill in the art.**

Applicant respectfully traverses the Examiner's rejection. Claim 1 recites a magnetic head including a first magnetic pole layer, a second magnetic pole layer disposed closer to the trailing end than the first magnetic pole layer, a soft magnetic pedestal adjoining the second pole layer; and a conductive section disposed between and electrically isolated from the first and second pole layers. Claim 1 further recites that the pedestal is disposed closer than the second pole layer to the medium-facing surface and extends less than the second pole layer extends from the medium-facing surface. Claim 1 further specifies that the pedestal is separated from the first pole layer by a nonferromagnetic gap and that the pedestal has a thickness that is less than four hundred and fifty nanometers between the gap and the second pole layer.

Thus, the recited pedestal of claim 1 has a specific thickness of less than four hundred and fifty nanometers in the region between the gap and the second pole. As a result, more precise tailoring of the track width during trimming of the pedestal and throat layers may be achieved. Specification, paragraphs 22 and 25.

Sasaki I fails to teach or suggest the combination of elements of the magnetic head recited in claim 1, particularly including the range of thicknesses for the soft magnetic pedestal. More specifically, Applicant disagrees that Sasaki I is silent as to the thickness of the soft magnetic pedestal. In the Figures cited by the Examiner (e.g. 12A) as well as the accompanying Figures (9A-13) and the corresponding discussion in col. 12, line 61-col. 14, col. 22, Sasaki I describes formation of a head. As part of this discussion, Sasaki I describes formation of the "pole tip 22" which the Examiner cited as corresponding to the recited soft pedestal layer. Sasaki I, col. 13, lines 18-20. Sasaki I expressly states that "[t]he thickness of the pole tip 22 is about 1 to 3  $\mu\text{m}$ , for

example.” Sasaki I, col. 13, lines 20-21. Further, although other sizes are mentioned, Applicant respectfully submits that these relate to the width of the pole, rather than the thickness of the pedestal. See, for example, Sasaki I, col. 11, lines 46-54 and col. 14, lines 3-14. Consequently, the thicknesses of the pole tip in Sasaki I is well outside the range that is recited in claim 1. Sasaki I, therefore, fails to teach or suggest the soft magnetic pedestal recited in claim 1.

Moreover, Applicant respectfully submits that one of ordinary skill in the art would not be motivated to modify Sasaki I to satisfy the relationships set forth in claim 1. Applicant notes that “[t]he mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination”. MPEP 2143.01(III). Thus, the mere possibility that a soft magnetic pedestal might be designed with the recited limitations is insufficient. There must be some teaching or suggestion in Sasaki I or the related art of the claimed element or to make an appropriate modification to Sasaki I. However, Sasaki I specifically describes a range of thicknesses that is at least a factor of two times the largest recited thickness of the soft magnetic pedestal. As such, Applicant respectfully submits that Sasaki teaches away from the recited range of less than four hundred and fifty nanometers. Accordingly, Applicant respectfully submits that claim 1 is allowable over the cited references.

Claims 4-7, and 10-11 depend upon independent claim 1. Consequently, the arguments herein apply with full force to claims 4-7 and 10-11. Accordingly, Applicant respectfully submits that claims 4-7 and 10-11 are allowable over the cited references.

The Examiner rejected claims 1-2, 5, 10, 15, 18, and 23 under 35 U.S.C. § 103 as being unpatentable over U.S. Patent No. 6,459,543 (Sasaki II). In so doing, the Examiner indicated that Sasaki II “remains silent as to the specific relationships set forth in claim 1.” However, the Examiner conclude that Sasaki II renders claim 1 unpatentable because “[i]t would have been

obvious to a person having ordinary skill in the art to have had the magnetic head of Sasaki

[II]satisfy the relationships set forth in claim 1.” In particular, the Examiner concluded that it is well known:

**in the magnetic head art to routinely modify a magnetic head structure in the course of routine optimization/experimentation and thereby obtain various optimized relationships including those set forth in claim 1. Moreover, absent a showing of criticality (i.e., unobvious or unexpected results), the relationships set forth in claim 1 are considered to be within the level of ordinary skill in the art.**

Applicant respectfully traverses the Examiner’s rejection. Claim 1 recite magnetic head having a trailing end pedestal with a thickness of less than four hundred and fifty nanometers in the region between the gap and the second pole. Claim 14, and thus claim 15, include a similar recitation for the second soft magnetic pedestal. Thus, as discussed above, more precise tailoring of the track width during trimming of the pedestal and throat layers may be achieved for the magnetic heads of claims 1 and 15. Specification, paragraphs 22 and 25.

Sasaki II fails to teach or suggest a magnetic head having the soft magnetic pedestal and second soft magnetic pedestal (collectively trailing pedestals) recited in claims 1 and 15, respectively. FIG. 15, cited by the Examiner, and the discussion of this (fifth) embodiment of Sasaki II does not mention the thickness of the pedestal 11a. However, the first embodiment of Sasaki II does include mention of the thickness of the pedestal 11a. In particular, Sasaki II states that “[t]he pole portion layer 11a has a thickness of 2 to 4  $\mu\text{m}$ , for example.” Sasaki II, col. 13, lines 52-53. Consequently, the thicknesses of the pole tip in Sasaki II is well outside the range that is recited in claims 1 and 15. Sasaki II, therefore, fails to teach or suggest the trailing pedestals recited in claims 1 and 15.

Moreover, Applicant respectfully submits that one of ordinary skill in the art would not be motivated to modify Sasaki II to satisfy the relationships set forth in claims 1 and 15. Applicant notes that “[t]he mere fact that references can be combined or modified does not render the

resultant combination obvious unless the prior art also suggests the desirability of the combination”. MPEP 2143.01(III). Thus, the mere possibility that the trailing pedestals might be designed with the recited limitations is insufficient. There must be some teaching or suggestion in Sasaki II or the related art of the claimed element or to make an appropriate modification to Sasaki II. However, Sasaki II specifically describes a range of thicknesses that is at least a factor of four times the largest recited thickness of the trailing pedestals recited in claims 1 and 15. As such, Applicant respectfully submits that Sasaki II teaches away from the recited range of less than four hundred and fifty nanometers. Accordingly, Applicant respectfully submits that claims 1 and 15 are allowable over the cited references.

Claims 2, 5, and 10 depend upon independent claim 1. Claims 18 and 23 depend upon independent claim 15. Consequently, the arguments herein apply with full force to claims 2, 5, 10, 18, and 23. Accordingly, Applicant respectfully submits that claims 2, 5, 10, 18, and 23 are allowable over the cited references.

In the above-identified Office Action, the Examiner rejected claim 14 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent Application Publication No. 20030179497 (Harris). In so doing, the Examiner cited FIG. 8 of Harris.

Claim 14 recites a magnetic head including first and second soft magnetic pole layers and first and second soft magnetic pedestals. Claim 14 further recites that the first and second soft magnetic pedestals have track widths that are substantially aligned for a distance that is less than nine hundred nanometers. Claim 14 also recites that the second soft magnetic pedestal has a thickness of less than four hundred fifty nanometers between the nanoscale nonferromagnetic gap and the second soft magnetic pole layer.

Thus, claim 14 recites a specific overlap, or track width, of less than nine hundred nanometers and that the second pedestal has a particular thickness. Consequently, as discussed above, more precise tailoring of the track width during trimming of the pedestal and throat layers may be achieved for the magnetic head of claim 14. Specification, paragraphs 22 and 25.

Harris fails to teach or suggest the combination of elements in the magnetic head of claim 14. In particular, Harris fails to teach or suggest a second soft magnetic pole that has a thickness of less than four hundred fifty nanometers and which overlaps the track width of the first soft magnetic pole by less than nine hundred nanometers. Although Harris's discussion of FIG. 8 fails to mention the thicknesses and track widths of the pedestals 152 and 178, other portions of Harris do mention some dimensions. In particular, Harris describes a head that has a lower (first/leading) pedestal that has a thickness of at least 0.5 and not more than 5  $\mu\text{m}$ . Harris indicates that the preferred thickness is approximately 3  $\mu\text{m}$ . Harris, paragraph 47. Harris further states that at least a portion of the pedestal has a width of greater than 2  $\mu\text{m}$ . Harris, paragraph 47. Despite description of the dimensions of other pedestals, Harris is devoid of mention of the dimensions of the trailing pedestal.

Applicant respectfully submits that one of ordinary skill in the art would not be motivated to modify Harris to satisfy the relationships set forth in claim 14. Again, "[t]he mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination". MPEP 2143.01(III). Thus, the mere possibility that the trailing pedestals might be designed with the recited limitations is insufficient. There must be some teaching or suggestion in Harris or the related art of the claimed element or to make an appropriate modification to Harris. Applicant can find no indication in Harris that the specified ranges are desirable or even possible. This is despite Harris's discussion of the

dimensions of other portions of the magnetic head. Further, as discussed above, use of a pedestal having a thickness of less than four hundred fifty nanometers provides a benefit not mentioned in Harris or in any portion of the field cited by the Examiner: improved track width control.

Accordingly, Applicant respectfully submits that claim 14 is allowable over the cited references.

In the above-identified Office Action, the Examiner rejected claims 25-26, 28, and 35 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent Application Publication No. 20050180048 (MacDonald).

Applicant respectfully traverses the Examiner's rejection. Claim 25 recite a magnetic head having a leading end, a trailing end and a medium-facing surface. Claim 25 recites that the magnetic head includes a first soft magnetic pole layer having a return pole tip, a second (trailing end) soft magnetic pole layer, a soft magnetic pedestal adjoining the second soft magnetic pole layer, and a conductive section. Claim 25 recites that the second soft magnetic pedestal terminates adjacent to the medium-facing surface in a write pole tip that is at least two orders of magnitude smaller than the return pole tip and that the second soft magnetic pedestal has a thickness that is less than two hundred and fifty nanometers between a gap and the second soft magnetic pole layer. Thus, the magnetic head recited in claim 25 has a combination of a thin trailing pedestal having a thickness of less than two hundred fifty nanometers in a specified region and a return pole tip that is at least two orders of magnitude larger than the write pole tip. Consequently, track width control and track width size may be improved. Specification, paragraphs 22, 25, and 33.

MacDonald fails to teach or suggest the combination of elements in the magnetic head of claim 25. In particular, MacDonald fails to teach or suggest a second soft magnetic pole that has a thickness of less than two hundred fifty nanometers in a specified region in combination with a



return pole tip that is at least two orders of magnitude larger than the write pole tip. Instead, MacDonald is concerned with misalignment between the edges of the poles. MacDonald, paragraph 18. Consequently, MacDonald describes a process that allows for improved alignment in the track-width direction. See, for example, MacDonald, paragraphs 21-26. In the particular head shown in FIG. 11, cited by the Examiner, the write pole does appear to be smaller than the return pole. However, in MacDonald's discussion of FIG. 11, as well as the remaining discussion of other heads using the teachings of MacDonald, Applicant has found no mention of a particular thickness of the trailing pedestal. More specifically, Applicant has found no discussion in MacDonald of a two hundred fifty nanometer upper bound to the thickness of any portion of the trailing pedestal. Further, Applicant has found no mention in MacDonald of a lower bound limit to the relationship between the sizes of the return and write pole tips. Consequently, MacDonald fails to teach or suggest the recited limitations of the head in claim 25.

Applicant respectfully submits that one of ordinary skill in the art would not be motivated to modify MacDonald to satisfy the relationships set forth in claim 25. Again, "[t]he mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination". MPEP 2143.01(III). Thus, the mere possibility that the trailing pedestals might be designed with the recited limitations is insufficient. There must be some teaching or suggestion in MacDonald or the related art of the claimed element or to make an appropriate modification to MacDonald. Applicant also respectfully submits that a conclusion that MacDonald renders claim 25 obvious based solely on the sizes of the poles in FIG. 11 of MacDonald involves improper hindsight. One "cannot use hindsight reconstruction to pick and choose among isolated disclosures in the prior art to deprecate the claimed invention." In re Fine, 5 USPQ2d 1596, 1600 (Fed. Cir. 1988). See also In re Fritch, 23 USPQ2d 1780, 1783 (Fed.

Cir. 1992). In addition, Applicant notes that MPEP 2145(B) indicates that: “[t]he admonition that ‘obvious to try’ is not the standard under § 103 has been directed mainly at two kinds of error. In some cases, what would have been ‘obvious to try’ would have been to vary all parameters or try each of numerous possible choices until one possibly arrived at a successful result, where the prior art gave either no indication of which parameters were critical or no direction as to which of many possible choices is likely to be successful . . .’ *In re O’Farrell*, 853 F.2d 894,903, 7USPQ2d 1673, 1681 (Fed. Cir. 1988) (citations omitted). . .” Applicant can find no indication in MacDonald that the specified ranges of two different dimensions (thickness of the pedestal and ratio of return pole tip to write pole tip) are desirable or even possible. Consequently, the possibility that one of ordinary skill in the art might vary numerous parameters for a magnetic head, including two different dimensions of the head, does not render the claim specifying the ranges of thickness of the pedestal and relationship between the write pole tip and the return pole tip. Accordingly, Applicant respectfully submits that claim 25 is allowable over the cited references.

Claims 26, 28, and 35 depend upon independent claim 25. Consequently, the arguments herein apply with full force to claims 26, 28, and 35. Accordingly, Applicant respectfully submits that claims 26, 28, and 35 are allowable over the cited references.

Applicant's attorney believes that this application is in condition for allowance. Should any unresolved issues remain, Examiner is invited to call Applicant's attorney at the telephone number indicated below.

Respectfully submitted,

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